

# Monitoring in a Performance Based Environment

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## National Monitoring Conference

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**May 19, 2004**

# Objectives of Today's Presentation

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- Define PBS and methods comparability
- Offer alternative terms
- Discuss in context of methods comparability
- Explain the Methods Board's Position
- Discuss requirements and constraints in a compliance monitoring environment
- Discuss pilot studies
- Discuss several approaches toward PBS

# What is PBS?

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A performance based system permits the use of any scientifically appropriate method that demonstrates the ability to meet established performance criteria and complies with specified data quality needs or requirements

Methods Board - 1999

# Alternative Terms

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- The term PBS or PBMS has emotional baggage associated with it due to lengthy and sometimes acrimonious debate
- Suggest the following alternatives
  - Methods flexibility
  - Comparable methods
  - Don't use a term (NELAC Standard)
- Requires subsequent discussion

# What is Methods Comparability?

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The characteristics that allow data produced by multiple methods to meet or exceed the data-quality objectives of primary and secondary users. These characteristics include data quality objectives (DQOs), measurement quality objectives (MQOs), bias, precision, information on data comparability, and so forth

# What are DQOs and MQOs?

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- DQOs are statements that define the confidence required in conclusions drawn from data produced by a project
- MQOs are statements that contain specific units of measure, such as precision and accuracy. They should be thoroughly specified to allow specific comparisons of data to an MQO.

# Characteristics of Acceptable Methods and Their Use

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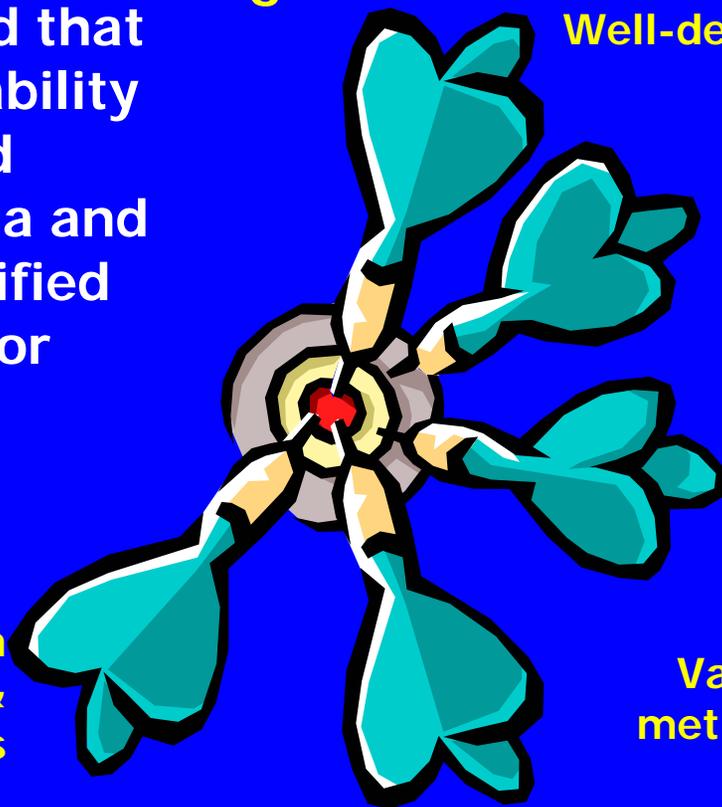
- Emphasizes identifying and adhering to Measurement and Data Quality Objectives (MQOs and DQOs)
- Validated with acceptable performance criteria
- Both prescriptive methods and those used in a PBS must meet these characteristics
- Acceptable methods, whether prescriptive or performance based, must yield data of known quality, so that they can be compared

NOTE: Confusion exists over method acceptability by those advocating or disparaging a prescriptive or a performance based approach

# Key Elements of Methods Board Approach to a PBS

A performance based system permits the use of any scientifically appropriate method that demonstrates the ability to meet established performance criteria and complies with specified data quality needs or requirements

For a performance based system to work, at least 5 darts have to hit the target...



Well-defined MQOs & DOOs

Adequate supply of reference materials for method validation

Known performance characteristics

Adequate training in development of MQOs & validation of methods

Validated or reference methods shown to meet specific MQOs

# What About Compliance Monitoring?

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- Compliance data must be reliable, provide the desired sensitivity, accuracy, and precision required by the particular regulatory program
- In other words the methods used to generate data **must be able to be compared**, whether they are obtained through a prescriptive or performance based approach
- The importance of methods comparability and ways of assessing it cannot be overemphasized

# What About Compliance Monitoring?

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- Liability issues
- Data collected have legal ramifications and must be able to be used to support enforcement actions in a court of law
- State approval of alternative (PBS) methods
- Confidentiality of patented methods
- Proper training of laboratory staff, auditors, and regulators

# COD Pilot Study

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- Two approaches to PBS:
  - Reference method approach: compare results of a new method to those of the approved (reference) method
  - Measurement Quality Objective (MQO) approach: compare method performance to stated MQO's
- Initial demonstration that lab is capable of using methods

# What Was Examined in This Pilot?

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- Two methods for chemical oxygen demand (COD) studied:
  - Approved reference method (Hach 8000)
  - New Hach method (10125) -- doesn't use or generate hazardous chemicals
- Analyses of methods using representative wastewater samples
- Eight labs participated, plus many more expert reviewers, data analysts, and data auditors

# What Did the Pilot Show?

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- Analysis of 12 matrix spikes, along with associated unspiked samples, allowed a statistical assessment of whether a laboratory could use the alternative COD method using a PBS approach.
- Analysis of actual samples (matrices) are critical to success of a PBS (note: also for prescriptive methods)
- Different results were obtained depending on the type of PBS used (reference methods or MQO)

# What Did the Pilot Show?

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- Lab performance of the approved (reference) method should be documented in any PBS
- Labs did not always obtain satisfactory results using the approved or new method -- a profound observation that speaks to laboratory performance whether a prescriptive or PBS methods approach is used

# Biological Assessment Comparability Pilots

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- Many different state, federal, and private biological methods exist in the U.S. – increased interest in performance and comparability of these methods for a national assessment
- Several pilot studies conducted or underway; e.g., Methods Board – Wisconsin DNR pilot examining performance and comparability of current DNR methods, potential alternate methods, and EMAP method.

# Biological Assessment Comparability Pilots

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- EPA's Wadeable Stream Assessment includes funding for state-initiated comparability studies
- Current study design incorporates Methods Board recommendations regarding sampling design and characterizing method performance characteristics
- Results of these studies could be used to help improve biological assessment methods, where needed, and obtain comparable state data for use in future national assessments; i.e., 305(b)

# Different Ways of Implementing a PBS

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- Focus on developing a new or modified method according to a prescribed protocol so that validation insures methods comparability. Focus is on methods development, that includes matrix evaluation
- Focus on method evaluation based on comparison to reference method performance criteria and evaluation in matrices



